

The Birthday Polynomial Project

This assessment was inspired by and adapted from
<http://jfmueeller.faculty.noctrl.edu/toolbox/examples/engel14/project.pdf>

Objective of Task:

To create, characterize, and graph a polynomial functions that reflects you

To demonstrate an understanding of polynomial functions ($n \geq 4$) and analysis through a creative lens

Product:

You will create a polynomial that reflects you and conduct analysis on it. Your presentation of your polynomial, its connection to you, and your findings of its main attributes may take the form of a small poster, a picture and essay, a pamphlet, a PowerPoint, or a video. All finalized analysis work will be completed (neatly!) on the attached sheets and turned in with your final product. **Your work should be colorful, neat, and accurate.**

Planning:

Date	Planning my time
Wednesday, October 21	Classtime to begin project
Thursday, October 22	
Friday, October 23	
Saturday, October 24	
Sunday, October 25	
Monday, October 26	Study for test tomorrow.
Tuesday, October 27	
Wednesday, October 29	Check project against rubric and self-grade
Thursday, October 30	Project due in class.

Grade:

This project will be a quiz grade in Quarter 2. See rubric for an exact breakdown of the points.

Process:

1. Identify the digits of the month (1 or 2 digits), day (1 or 2 digits) and year (4 digits) of your birthday. For example, Erin was born on March 3, 1983, so her ordered birthday digits are 331983. She can use only these digits to create her polynomial.
2. Use your birthday day and your birth month digits to create 2 - 4 rational roots. Use your year digits as coefficients in the remaining factored form or as a leading coefficient. Your polynomial must have a leading exponent greater than or equal to 4.
For example, Erin could start her polynomial by doing...
 $(x-3)(x+3)(x^2 + 9x - 83)$ or $-1(x-3)^2(x+3)(9x^2 + 8x - 3)$
3. Expand your factored polynomial from step 2. Examine the graph. Does it reflect you? Experiment with the signs and the placement of the birthday digits until you have a graph that expresses you in some way or whose shapes pleases you for some reason.
4. Analyze your polynomial by finding the following and clearly discussing these somewhere in your final product:
 - End behavior
 - All *possible* rational roots
 - All zeros
 - Y-intercept
 - Number of turning points
5. Sketch an accurate graph of your polynomial on your fact sheet using your analysis in step 4. Verify your graph using a graphing utility.
6. You may use graphing utilities (calculator, Desmos) to make your zero-finding work more efficient; however, you must show all your work for finding zeros on the attached page.

Name: _____

My Polynomial Fact Sheet

This sheet will be turned in with your final product. It is strongly recommended that you do your original work on a separate sheet and copy it over (neatly!) onto this page.

I was born _____.

My birthday polynomial in factored form is _____.

My birthday polynomial in expanded form is _____.

My polynomial has end-behavior that is _____ because...
_____.

My polynomial has at most _____ turning points.

The y-intercept of my polynomial is _____. Work is shown below.

List of all possible rational zeros for your polynomial: _____.

Find all zeros for your polynomial: _____.

Show calculation work clearly in the space below. If you need more space, attach another sheet.

Name: _____

My Polynomial Fact Sheet

Graph your polynomial in the space below:

This polynomial connects to you because...

Rubric

	Weight	Poor	Good	Excellent
		0-1	2-4	5
Polynomial selection	x 1	The polynomial does not meet the criteria ($n \geq 4$, 2-4 rational roots, using all birthday digits) or is not a polynomial.	The polynomial meets some of the criteria ($n \geq 4$, 2-4 rational roots, using all birthday digits). May or may not be a polynomial.	The polynomial meets all of the criteria ($n \geq 4$, 2-4 rational roots, using all birthday digits) and is irrefutably a polynomial.
Polynomial accuracy analysis (as seen on fact sheet)	x 2	The fact sheet analysis has multiple errors in the areas of end behavior, all possible roots, all zeros, y-intercept, or number of turning points	The fact sheet analysis has some errors in the areas of end behavior, all possible roots, all zeros, y-intercept, or number of turning points	The fact sheet analysis has no errors in the areas of end behavior, all possible roots, all zeros, y-intercept, or number of turning points.
Polynomial graph accuracy (as seen on fact sheet)	x 2	The fact sheet graph of the polynomial is not accurate in multiple ways and/or the justification of polynomial connection was missing.	The fact sheet graph of the polynomial is not accurate in a few ways The justification of the polynomial connection was missing or cursory.	The fact sheet graph of the polynomial is accurate in all areas and the justification of the polynomial connection is detailed and thoughtful.
Completeness of presentation	x 2	The presentation does not include all information from the fact sheet. Multiple areas are missing and/or inaccurate.	The presentation is missing some information from the fact sheet and/or some information may be inaccurate.	The presentation includes all information from the fact sheet and all information is accurate.
Accuracy, creativity, and neatness of presentation	x 1	The presentation lacks color, neatness, or adherence to guidelines. Effort and attention to detail is lacking.	The presentation is colorful, neat, and presented in an acceptable format. Effort and attention to detail mostly clear.	The presentation is colorful, neat, and presented in a carefully constructed format. Effort and attention to detail is irrefutably clear.